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Quaternary.—According to Prof. J. N. Woldrich, seven or eight forms of domestic dogs have existed in Europe from alluvial times until now, while four species of diluvial dogs are known. Existing European dogs are therefore not descended from any species of *Canidæ* now living in Europe, though they may have been crossed with the wolf, fox, or jackal. The so-called feral dogs of Syria may be the remnant of a diluvial true wild dog, the greyhound is said to be certainly descended from a diluvial ancestor of the African *Canis simensis*, and long-eared small dogs may be descended from a diluvial ancestor of the fennec.—Sir R. Owen has described the premaxillary and scalpriform teeth of a large extinct wombat (*Phascolomys curvirostris* Ow.) from the Wellington bone caves. The animal must have been somewhat smaller than the type of the sub-genus *Phascolomys*.

MINERALOGY AND PETROGRAPHY.¹

PETROGRAPHICAL NEWS.—In a "Preliminary paper on an investigation of the Archæan formations of the Northwestern States,"² Professor R. D. Irving mentions the results he has reached in the study of the Archæan formations in the region extending from Lake Huron to Southeastern Dakota. These results, as well as those reached by other investigators, have been incorporated in a map which presents in good form the present views held by the author in regard to the distribution of the rocks of this region. The map is accompanied by a report of the work which has already been done in the various districts and a description of the plans to be followed in the solution of problems which are presented in such great number. These problems are all of the very highest importance to a knowledge of the relations which the older formations bear to each other, and to the explanation of the origin of the crystalline schists. The subject of metamorphism in the Huronian rocks is referred to, and a promise is made that before long some publications in this direction may be expected. A microscopical examination of hornblende rocks, occurring throughout the region, seems to point to the conclusions (1) that many of the non-schistose varieties are really changed augitic eruptives; (2) that some of the hornblende schists were originally also augitic eruptives, while others grade into and are associated with the hornblende gneisses. In these the hornblende appears always to be of a secondary nature, every phase being found between schists in which augite excludes the hornblende to others in which the hornblende excludes augite. (3) The so-called actinolite schists are sometimes only the result of extreme alteration of eruptive green stones. The fact of the

¹ Edited by W. S. BAYLEY, Johns Hopkins University, Baltimore, Md.

² Fifth annual report of the Director of the U. S. Geol. Survey. Washington: Government Printing Office, 1885.

secondary origin¹ of brown basaltic hornblende is emphasized. The proof relied upon for this belief is, (1) the intimate relation of the two minerals; (2) the occurrence in the hornblende of cores of augite, several of which polarize together; (3) the occurrence of every phase of change from complete augite to complete hornblende, and (4) the nearly invariable coincidence of the occurrence of the secondary hornblende with other indications of alteration.—In a "Note on the microscopic structure of some rocks from the neighborhood of Assouan," collected by Sir J. W. Dawson,² Professor Bonney describes³ gneisses, granites, hornblende schist, quartziferous kersantite and a "schistose rock, not of a highly metamorphic aspect," which "has been made out of a diorite or a hornblende schist." In some of the gneisses structures were observed which the author thinks are characteristic of the older rocks of this nature and very similar to a quartz or a gneiss from the Greenville series, occurring near Papineauville station on the Ottawa river.—Messrs. Michel Lévy and J. Bergeron⁴ have recently been at work on the eruptive rocks of the Ronda mountains in the southern part of Spain. They consist principally of norites, lherzolites, tourmaline, granite and diorites. Like MacPherson before them, Lévy and Bergeron think that the serpentines have been derived by the decomposition of lherzolites. This latter rock, by the assumption of anorthite, frequently passes over into norite. The constituents of this are spinel, twins of zonal olivine, twinned anorthite, chromiferous pyroxene in twinning relation with large bands of eustatite and a little black secondary mica. Bronzite often occurs in large crystals, giving the rock the appearance of a porphyrite. Ophitic rocks from the same region are composed of titanite iron, labradorite and pyroxene, with a little olivine in the most basic varieties. The most interesting fact in connection with these rocks is the occurrence in them of a secondary glaucophane with the usual pleochroism. The most ancient schistose⁵ rocks are the cordierite gneisses and amphibolites. In a mass of dolomite, intercalated in the gneiss, the following minerals were found in the order of their crystallization: pyrite, ilmenite, sphene, rutile, pargasite, humite, clino-humite, pleonast, anorthite and talc. Following the schistose rocks in age, occur eclogites and crystalline limestone containing metamorphic minerals, among which are epidote, sphene, rutile and scapolite.

¹ Cf. AMERICAN NATURALIST. December, 1885, p. 1215, and G. H. Williams, *Amer. Jour. Sci.*, October, 1884, p. 259.

² The *Geological Magazine*, March, 1886, p. 103.

³ *Ib.*, October, 1884, p. 440.

⁴ *Comptes Rendus*, Mars 15, 1886, p. 640.

⁵ *Ib.*, Mars 22, 1886, p. 709.

MINERALOGICAL NEWS.—A. Lacroix¹ has an article in the "Comptes Rendus" on the optical properties of some minerals which are without crystal forms. In it he affirms the discovery by Des Cloizeaux that grünerite is an amphibole and not, as is generally held, a pyroxene. Its cleavage planes make an angle of 124° with each other. The plane of the optical axes is $\infty P \infty$ and the bisectrix is negative and inclined 15° to the normal to the orthopinacoid. Pleochroism is feeble and twins are abundant. Warwickite is a borotitanate of iron and magnesium. Its crystal system is not positively known. A microscopical examination makes it appear orthorhombic, with a pleochroism in three shades of brown. The plane of the optical axes is $\infty P \infty$, the bisectrix being positive and normal to this, which is the direction of easy cleavage. Withamite, xantholite, scoulerite and chalilite are identified respectively with piedmontite, staurolite and thomsonite, of which the latter two are but impure varieties.—Some interesting manganese minerals are described by Weibull² from the Wester-Silfberg mine in Dale Karlén, Sweden. A manganese magnetite gave on analysis 6.27 per cent of MnO. It is uncrystallized and is associated with masses and grains of mangano-calcite. The massive variety contains 6.98 per cent of MnO and the granular mineral 24.32–24.89 per cent. A careful examination of Igelströmite³ $(2Fe_2(Mg) SiO_4 + Mn_2(Mg) SiO_4)$ proves it to be orthorhombic, with the optical axes in the plane of the base and the a axis the negative bisectrix. Pleochroism: b = grayish-yellow, α = grayish-yellow-white, ϵ = yellowish-gray. Absorption, $\alpha > b > \epsilon$. Silfbergite, first described by Weibull⁴ in 1883, is further investigated. Its crystals are bounded only by the planes ∞P and $\infty P \infty$, parallel to which the cleavages run. In polarized light these crystals are seen to be composed of twinned lamellæ with the orthopinacoid the twinning plane. The plane of the optical axes is the plane of symmetry, and the double refraction is negative. The pleochroism is marked, ϵ = dirty brown, b = brownish-yellow with a green tinge, α = yellow white. Absorption, $\epsilon > b > \alpha$. An analysis of a pure variety gave:

SiO ₂	FeO	MnO	MgO	CaO	Al ₂ O ₃	H ₂ O
49.50	30.69	8.24	8.10	2.02	.69	.40

In the same article the author reports the result of a re-examination of the Knebelite of Dannemora. This mineral occurs in columnar masses of black to blackish-gray individuals, with three cleavages, one parallel to the faces of a prism of $50^\circ 6'$, very perfect, and the other two parallel to the brachy and macro-pinacoids. A parting perpendicular to the three cleavages was also

¹ Comptes Rendus, CII, Mars 15, 1886, p. 643.

² Mineralogische und Petrographische Mittheilungen, VII, 1885, p. 108.

³ Cf. Zeitschrift f. Kryst., VIII, p. 647.

⁴ Geol. Fören. Förhandl., VI, p. 504.

observed. The relation of the horizontal axes is 0.467:1. The axial plane is the base, with the *a* axis the negative bisectrix. The pleochroism is strong, *a* + *b* yellowish-gray, *c* = grayish-white. $a > b > c$. The analysis of Knebelite would indicate that it is a manganese olivine, with most of the optical properties of this mineral.

BOTANY.¹

VARIATIONS OF *TRADESCANTIA VIRGINICA*.—An interesting case of floral variation is under observation by the writer in the shape of a highly aberrant form of *Tradescantia virginica*, or spiderwort, also called, in quaint allusion to the ephemeral nature of its petals, "widow's tears." Said plant presents, as the result of thirteen years' cultivation, the curious aspect of a monocotyledonous plant having in bloom, at the same time, flowers of dimerous, trimerous, tetramerous, pentamerous, hexamerous and heptamerous types respectively, each flower having twice as many stamens as sepals, petals or carpels of ovary. The plant was set out in 1872 and received very rich treatment, so that it gave forth blossoms measuring two inches in diameter. In 1874 it began to deviate from the original trimerous type and to assume the tetramerous one, by developing another petal, and instead of doing this at the expense of the pistil or stamens, it *added* another sepal, another carpel with style, and two stamens, thus making a typical tetramerous flower. The plant has since then continued to differentiate in a greater degree each succeeding year, the differentiated forms being typical plants and maturing seed capable of perpetuating and possibly increasing the differentiation. The seed of differentiated forms gives plants having a large number of aberrant forms, while that of normal flowers gives a few abnormal forms, showing that the plant is working out a plan of evolution. The original trimerous plant was set out in 1872; in 1874 the tetramerous plant was evolved; in 1876 the pentamerous; in 1879 the hexamerous; in 1882 the dimerous; and in 1884 the heptamerous. Of these differentiated forms, as observed last year, the most plentiful were the *pentamerous* flowers, giving a complete refutation to the dictum, "*Endogens never have the parts of the flowers in fives.*"

The dimerous and heptamerous types are as yet but few, as they are struggling for existence. The hexamerous and heptamerous flowers occasionally show an imperfect carpel, and in one case a heptamerous flower had an octamerous ovary with two imperfect carpels, showing that seven is evidently not the limit of differentiation. A number of interesting experiments have been made regarding the intensity of variation, showing that it is very pronounced.

Roots of this plant and seeds from trimerous, tetramerous,

¹ Edited by Professor CHARLES E. BESSEY, Lincoln, Nebraska.